Background: Point-of-care ultrasound is an effective and reliable method to diagnose the presence of an abdominal aortic aneurysm. However, there has been limited literature regarding ultrasound diagnosis of acute aortic thrombosis. Objective: Discuss a patient case with acute aortic thrombosis diagnosed by point-of-care emergency ultrasound. Review common etiologies and treatment options in this rare diagnosis. Case Report: A patient with a known abdominal aortic aneurysm presented with mottled lower extremities. Point-of-care ultrasound was utilized by her physicians to diagnose acute thrombosis of her abdominal aorta. With conservative treatment the patient survived to hospital discharge. Conclusion: Aortic thrombosis is a rare and devastating problem that can be diagnosed with point-of-care ultrasound. © 2012 Elsevier Inc.

Keywords—ultrasonography; emergency medicine; aortic aneurysm; abdominal; point-of-care systems; thrombosis

INTRODUCTION

Acute thrombosis of an abdominal aortic aneurysm (AAA) is a rare complication with a high mortality. Most cases in the literature have reported diagnosis by computed tomography (CT). We report a case diagnosed by emergency department (ED) point-of-care ultrasound.

CASE REPORT

An 82-year-old woman with a history of coronary artery disease, atrial fibrillation, and a known abdominal aortic aneurysm of 4.7 × 4.1 cm presented to the ED at our institution complaining of severe bilateral lower extremity pain and weakness. Over the preceding 2 days the patient had difficulty walking, and on the day of presentation she was unable to stand secondary to severe lower extremity weakness. Initially she had also complained of numbness and tingling in the lower extremities, but by the time of presentation she had lost all sensation in both lower extremities.

Her previous history included coronary artery disease, atrial fibrillation, systolic heart failure, and a recent diagnosis of abdominal aortic aneurysm. She had recently been hospitalized for a non-ST-elevation myocardial infarction (NSTEMI); during the hospitalization she had an automated implantable cardiac defibrillator implanted. She did not have any aortic instrumentation, such as a cardiac catheterization, during the hospitalization. During the previous hospital admission, the patient had ankle brachial indexes (ABI) performed, which were 1.1 on the right side and 0.92 on the left side. She had been discharged from the hospital 3 days before presentation. She was discharged on amiodarone, ezetimibe, simvastatin, furosemide, metoprolol, and warfarin.

Vital signs were: temperature 36.5°C, heart rate 50 beats/min, respiratory rate 18 breaths/min, and blood pressure 134/60 mm Hg, with pulse oximetry showing 100% on room air. Her physical examination showed that both of her lower extremities were cool, the skin was mottled below the inguinal ligaments bilaterally, and pulses were absent on both legs. Bedside ultrasound
was immediately performed by the authors and a 4.6-cm aortic aneurysm was observed, with complete occlusion by heterogenous echogenic clot with a lack of arterial pulsation (Figure 1). A longitudinal view of the proximal aorta displayed the aorta occluded by clot (Figure 2). There was no appreciable color Doppler signal in the abdominal aorta distal to the clot; however, there was severely blunted spectral Doppler flow with spectral broadening in the common femoral arteries (Figure 3).

Vascular Surgery was urgently consulted and evaluated the patient immediately and believed, secondary to the patient’s condition and comorbid diseases, that surgery or tissue plasminogen activator (tPA) would cause death. The patient and her family were in agreement and did not want to attempt surgery or tPA. The patient was placed on a continuous heparin infusion and admitted to the hospital. The patient was on warfarin therapy with an international normalized ratio (INR) of 3.2; it was 2.3 at the time of discharge from her recent NSTEMI.

The patient underwent a CT scan of the aorta after admission for staging and prognostic planning. Serial ultrasounds and CT scans showed recannulation of the aorta. On day 4 of admission, the patient developed a slight increase in sensation in both legs and pulses by Doppler interrogation. Repeat ABI of the right lower extremity was 0.32, and the left lower extremity was 0.22. The patient’s overall health improved and vascular surgery was considered: an axillary-femoral bypass surgery. The patient declined further intervention and continued to improve. An attempt was made to restart the patient’s warfarin therapy, however, her INR wildly fluctuated and the decision was made to hold further anticoagulation. The patient was discharged 20 days later to a nursing facility on her preadmission regimen with the addition of hydralazine, pentoxifylline, tramadol, oxycodeine, and a bowel regimen of stool softeners.

DISCUSSION

Complete acute thrombosis of AAA is a rare entity. The first case was reported by Shumacker in 1959 (1). Thrombosis of an AAA has been reported to occur in 0.7–2.8% of AAA cases (2,3). In 2003, Suliman et al. conducted a literature review on 48 cases reported in the literature and reported a mortality rate of 46% (4).

The clinical presentation of complete aortic occlusion is usually severe pain in both legs, mottling of the lower extremities, paresis, and paralysis of the lower extremities. This patient exhibited the classic symptoms.

Several factors have been reported as risk factors for AAA thrombosis, including surgical manipulation, trauma, thromboembolic disease, hypercoagulability disorders, or hypotension. The mechanism of complete occlusion is thought to be related to proximal extension of iliac thrombosis, hypotension leading to low-flow states, and thromboembolic episodes, including the dislodgment of mural thrombi. But in this case, the patient did not have any known surgical manipulation, but did have a history of atrial fibrillation that may have played a part in the cause of the occlusion despite her warfarin therapy with a therapeutic INR.

The most common methods for diagnosis of AAA are CT scan with or without intravenous (i.v.) contrast and ultrasound. Although both modalities are accurate, CT is less likely to be affected by technical or interpretation errors compared to ultrasonography. CT has also been reported to be more sensitive in detecting the presence of extra-luminal blood and retroperitoneal hemorrhage in the setting of AAA even without the use of i.v. contrast. However, the use of i.v. contrast is needed to evaluate for...
the presence of thrombus within the lumen of the aorta and vessel patency (5,6).

Ultrasound is a good modality to visualize the aorta at the bedside, as trained operators can obtain an accurate evaluation rapidly. However, to the best of our knowledge, there are no studies directly evaluating ultrasound in diagnosing complete aortic occlusion due to its rarity. There are several studies evaluating the use of ultrasound in diagnosing AAAs. Ultrasound has been studied as an effective diagnostic tool for AAA with a sensitivity between 96% and 98% compared to CT (7–14). Bedside ultrasound by physician operators has also been shown to be comparable in sensitivity to ultrasonography by a certified vascular technician, resulting in significant time savings to diagnosis and treatment (7,9,13,14). However, in up to 8% of non-fasting ED patients, portions of the aorta may not be visualized due to overlying bowel gas (15).

Diagnosis of arterial occlusion by ultrasound relies upon the absence of arterial pulsations, a vessel lumen filled with echogenic material, and absence of flow on Doppler imaging. The evaluation of this patient’s aorta demonstrated all of these findings. Compression sonography is not employed in arterial occlusive disease as with venous thrombosis (16).

The reported treatments of a thrombosed AAA are surgical or tPA and immediate anticoagulation with heparin to prevent further propagation of the thrombus. The optimal procedure for management of acute thrombosis is endoaneurowithorrhaphy with in-line aortic reconstruction (4). The axillofemoral bypass is an alternative in high-risk patients with severe comorbidities such as this case patient.

CONCLUSION

This is one of the first cases reported in the literature of acute aortic occlusion diagnosed with point-of-care emergency ultrasound.

REFERENCES